

# TWO CRISTATE MEGASPORES FROM THE LOWER CARBONIFEROUS OF SCOTLAND

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ABSTRACT. A new megaspore described under the name *Triletes pannosus* sp. nov. resembles in its crest of anastomosing hairs *T. subpalaeocristatus* Alvin from the same locality. A new specimen of this latter species has yielded further details of its structure. Comparison is made between the two species.

SOME fifteen specimens of a new megaspore were obtained from samples of shale collected at Oxroad Bay, East Lothian. The shale contains abundant seed megaspore membranes, microspores, and fragmentary carbonized plant remains. It was collected and macerated in the hope that it might yield whole specimens of a megaspore described recently from petrified material from the same locality under the name *Triletes subpalaeocristatus* Alvin (1965). This latter spore was so closely associated with the cone of the lycopod *Oxroadia gracilis* Alvin that it was almost certainly borne by this plant. It was described only from serial peel sections and was of interest because of its unusual morphology in possessing a crest of hairs along the lips of the trilete ridge. Oddly enough the new megaspore also possesses a crest, but appears genuinely distinct.

A new specimen of *T. subpalaeocristatus* has been found in the original block containing *Oxroadia*. This has been macerated out from the matrix and has yielded some new information about this species for which an emended diagnosis is now given.

## SYSTEMATIC DESCRIPTIONS

Genus TRILETES Bennie and Kidston ex Zerndt

*Triletes pannosus* sp. nov.

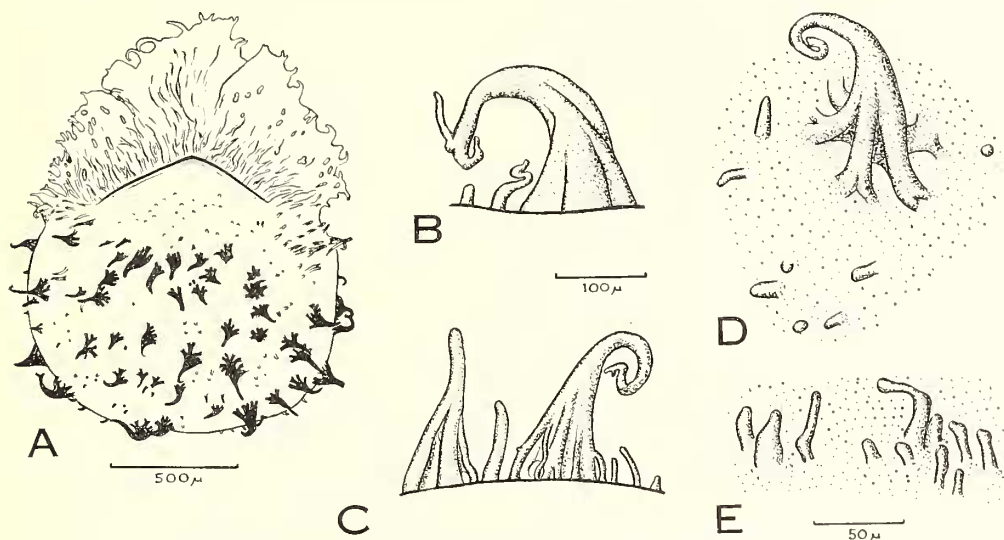
Plate 76, figs. 1-6; text-fig. 1 A-D

*Diagnosis.* Megaspore spheroidal; mean equatorial diameter 1,360  $\mu$  (range for nine spores measured 1,180-1,580  $\mu$ ); mean height (excluding crest) 1,260  $\mu$  (range for ten spores measured 1,100-1,440  $\mu$ ). Wall about 30-50  $\mu$  thick. Arms of trilete ridge extending about three-quarters the radius of the spore. Wall (except for contact areas) bearing numerous spines about 200  $\mu$  long, sometimes up to 400  $\mu$  and up to 200  $\mu$  wide at the base. Spines simple or forked near the tip, straight or commonly curved; base expanded and buttressed; buttresses often forming separate 'legs'. Papillae and simple hairs up to 100  $\mu$  long also present among the spines. Papillae, 10-20  $\mu$  in diameter, usually present on contact areas. Lips of trilete ridge bearing a prominent crest up to 660  $\mu$  high at the apex (mean height for twelve spores 525  $\mu$ ), diminishing to about half this at the ends of the trilete arms. Crest resembling a series of anastomosing hairs, but sometimes forming a more or less continuous membrane with free teeth distally; hairs or teeth of very varied thickness, generally 5-20  $\mu$ .

*Locality and horizon.* Oxroad Bay, East Lothian, Scotland. Cementstone Group (Upper Tournaisian), Calcareous Sandstone Series, Lower Carboniferous.

*Holotype.* British Museum (Natural History), Palaeontology Department, V52016a. The specific name is derived from the ragged appearance of the crest.

*Discussion.* The new spore most closely resembles *Triletes echinoides* Chaloner (1954), a species described originally from the Beaver Bend Limestone of the Mississippian of Indiana, but one which has since been recorded from a number of localities including



TEXT-FIG. 1. A-D, *Triletes pannosus* sp. nov. E, *Triletes subpalaeocristatus* Alvin. A, Specimen showing the general features. The crest, part of which is shown in Plate 76, fig. 6, shows an especially high degree of fusion among the hairs so as to form a more or less continuous membrane. Slide V52016e. B, C, Spines, short hairs, and papillae in profile. Slide V52016f, g. D, Part of the spore wall in surface view showing a single butted spine and papillae. Slide V52016e. E, Part of the wall in surface view. Slide V51513z.

Britain where it has been found in the sporophyll known as *Lepidostrobophyllum fimbriatum* (Kidston) (Allen 1951; Lacey 1962). Since the publication of the original description, the range in the equatorial diameter for the species has been extended to 1.2–4.0 mm., though the two original specimens were 2.66 mm. and 2.00 mm. The wide range virtually covers that for the new Scottish spore. The spines of *T. echinoides* are up to about 1 mm. long (Winslow 1959), whereas the maximum length in *T. pannosus* is only less than half this. The chief difference between the two species lies in the crest: in *T. echinoides* this has the form of a continuous fluted membrane with no indication of hairs or teeth or even of perforations.

In the general character of the ornamentation of the distal face, the new spore resembles a number of other Carboniferous spores, especially perhaps *T. crassiaculeatus* (Zerndt). However, this spore differs in the quite different form of the apical prominence.

The trilete crest of *T. pannosus*, in resembling a series of anastomosing hairs arising from the lips of the ridge, may be compared with that of *T. subpalaeocristatus* Alvin

(1965). Indeed, when the new spore was discovered it was thought that it might be identical with this species which had been based on specimens from a block of petrified plant material from the same locality. A new specimen of this spore has now been macerated from the original block and the following emended diagnosis incorporates the new information that this has yielded.

*Triletes subpalaecristatus* Alvin 1965

Plate 76, figs. 7, 8; text-fig. 1E

*Emended diagnosis.* Megaspore nearly spherical; mean diameter 1,450  $\mu$  (range for four spores 1,250–1,750  $\mu$ ); height (excluding crest) only about 50  $\mu$  less than equatorial diameter. Wall about 35–45  $\mu$  thick. Arms of trilete ridge extending the whole radius of the spore. Distal face and contact areas bearing scattered papillae and short hairs up to about 50  $\mu$  long. No distinct arcuate ridge, but contact areas delimited distally by a narrow zone of relatively dense papillae and hairs. Lips of trilete ridge bearing a crest of branched anastomosing hairs (3.5–) 6.5 (–13.0)  $\mu$  thick; maximum height of crest at apex up to 405  $\mu$ , height diminishing to about half this at the ends of the trilete arms.

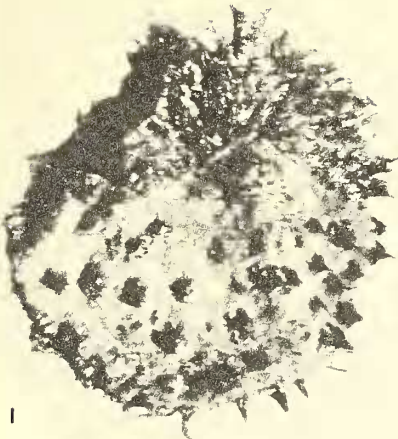
*Discussion.* This species, on the evidence of the new specimen, is rather less like *T. palaecristatus* Chaloner than was originally believed. It differs in possessing an ornamentation of short hairs and papillae scattered over the surface and in the delimitation of the contact areas by arcuate zones of denser ornamentation. The new specimen, in being somewhat larger than the original specimens, extends the size range so that this approaches more closely that for *T. palaecristatus*.

GENERAL DISCUSSION

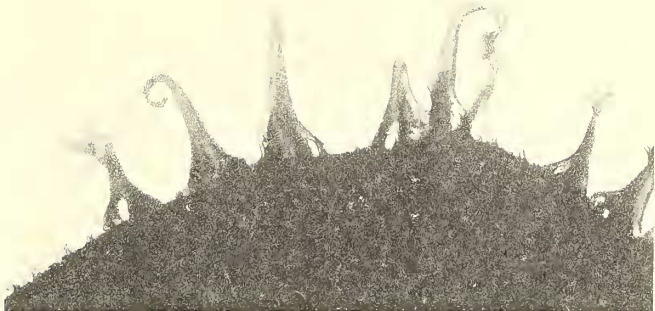
The similarity in certain characters, most notably the presence of an apical crest of hairs, between *T. subpalaecristatus* and *T. pannosus* is remarkable, especially as these are the only known megaspores from Oxroad Bay. Since the two species are based on material preserved in a different manner, the question immediately arises as to whether the difference between them might not be due either to the modes of preservation or even to the techniques used in preparing clean specimens. *T. pannosus* (Pl. 76, figs. 1–6; text-fig. 1A–D), coming as it does from the shale, is always compressed, but although some specimens are split open, the preservation is excellent. These spores were obtained by first breaking down shale samples in nitric acid and potassium chlorate, neutralizing and picking out the spores, and then freeing them from adhering mineral particles in hydrofluoric acid. The specimen of *T. subpalaecristatus* obtained free of matrix (Pl. 76, figs. 7, 8; text-fig. 1E) was etched from the block slowly in acetic acid and subsequently freed from siliceous material in hydrofluoric acid and from pyrite in nitric acid.

EXPLANATION OF PLATE 76

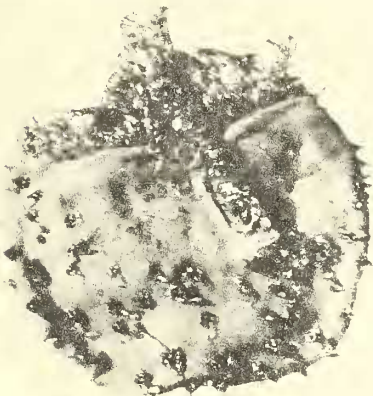
Figs. 1–6. *Triletes pannosus* sp. nov. 1, Holotype; Slide V52016a,  $\times 35$ . 2, Slide V52016b,  $\times 35$ . 3, Spines and papillae in profile; Slide V52016c,  $\times 80$ . 4–6, Portions of the crest of three different specimens showing variation in form; Slides V52016c, d, e,  $\times 80$ .  
Figs. 7, 8. *Triletes subpalaecristatus* Alvin. 7, New specimen isolated from the nodule; Slide V51513z,  $\times 35$ . 8, Portion of the crest of the same spore,  $\times 80$ .



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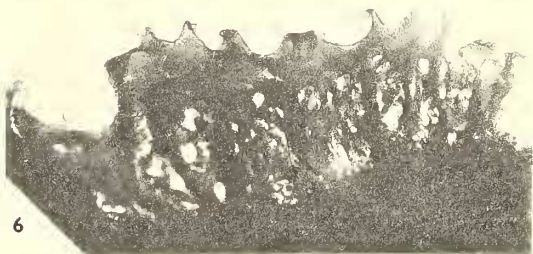
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8

ALVIN, Lower Carboniferous megaspores